MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

DCN5511 – DATA COMMUNICATIONS AND NETWORKING

(DIT)

12 MARCH 2020
9:00 a.m. – 11:00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS:

1. This Question paper consists of **THREE (3)** pages.
2. There are **FOUR (4)** structured questions in this paper. Each question carries total of **10 Marks**.
3. Answer **ALL** questions in the **Answer Booklet** provided.

Structured Questions [40 marks]

*Instruction: Write your answers in the **Answer Booklet**.*

Question 1

a) Briefly describe **ONE** function and give **ONE** example for the following types of data flow:

i. Half duplex (1 mark)
ii. Full duplex (1 mark)

b) State the type of addressing that are used in the following TCP/IP layers:

i. Application layer (0.25 mark)
ii. Transport layer (0.25 mark)
iii. Network layer (0.25 mark)
iv. Network access layer (0.25 mark)

c) State **TWO** characteristics of digital signal.

(1 mark)

d) Draw a time-domain plot given that a signal has a peak amplitude of 8 volts, frequency of 4 with phase of 270 degrees.

(1.5 marks)

e) Calculate the bandwidth of the network for a 25 kbyte image if its transmission time is 50 s. Write your answer in kbps.

(1.5 marks)

f) Calculate the sampling rate for a signal with a bandwidth of 9840 Hz (7450 to 17290 Hz) by using Nyquist Theorem.

(1 mark)

g) Draw a digital signal of a data stream 01101010 with Return to Zero (RZ) encoding.

(2 marks)

[TOTAL 10 MARKS]

Question 2

a) Calculate the baud rate for the given bit rate and type of modulation:

i. 64 kbps, 16-PSK (1 mark)
ii. 8800 bps, 32-QAM (1 mark)

Continued.....

b) Draw the constellation diagram based on the data points of (3, 0), (-3, 0), (0, 3) and (3, 0). Define the type of modulation (ASK, FSK, PSK or QAM) by identifying the number of phase and amplitude.

(2 marks)

c) Using FDM multiplexing, 7 voice channels with guard bands of 35×10^4 Hz are multiplexed together. Assume that the data channel has occupied a bandwidth of 4.2 MHz, calculate the maximum bandwidth for each voice channel. Write your answer in kHz.

(2 marks)

d) ***Figure 1*** shows synchronous TDM. Assume that 2 bits are taken from each input without synchronizing bits, draw the TDM frames showing the output bit stream.

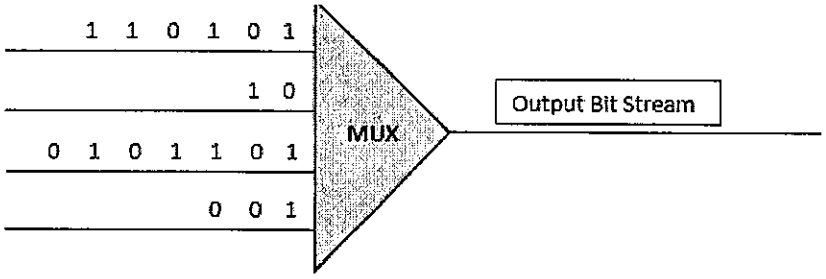

Figure 1

(2 marks)

e) List and briefly describe **TWO** modes of transmission in fiber-optic cable.

(2 marks)

[TOTAL 10 MARKS]

Question 3

a) By using even parity check, determine the parity bit for each of the following:

i. 1001001 (0.25 mark)
ii. 0101011 (0.25 mark)
iii. 1101011 (0.25 mark)
iv. 0011101 (0.25 mark)

b) Assume that a sender sends a block of information bits as below:

01101101 11110000 10100110 00110011

Determine the complete block of bits that will be received by the receiver if a two dimensional parity check is used.

(3 marks)

Continued.....

c) Briefly explain what Automatic Repeat Request (ARQ) is and list **TWO** types of ARQ.

(2 marks)

d) State **TWO** types of High-level Data Link Control (HDLC) frames.

(1 mark)

e) Draw a p-persistent strategy diagram. Briefly explain how p-persistent strategy works and its disadvantage.

(3 marks)

[TOTAL 10 MARKS]

Question 4

a) Determine the type of address (unicast, multicast or broadcast) with reason for the following MAC addresses:

i. FF: FF: FF: FF: FF: FF (0.5 mark)
ii. 3B: 46: 4A: 38: 00: 1F (0.5 mark)
iii. 01: 12: 5E: FF: FA: 07 (0.5 mark)
iv. FD: 8A: 2B: 54: 67: 6C (0.5 mark)

b) List **FOUR** major physical components of 802.11 LANs.

(1 mark)

c) Briefly describe **THREE** characteristics of hub.

(3 marks)

d) State **FOUR** features of Frame Relay network.

(4 marks)

[TOTAL 10 MARKS]

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